UMPQUA RIVER

Local Sponsor: Port of Umpqua

Project Description

The authorized project includes two jetties at the river's mouth. The north jetty is 8,000 feet long, while the south jetty is 4,200 feet long. As originally built, the jetties resulted in a river cross section that was too wide. This resulted in shoaling across the channel. In 1980, a training jetty was added on the south side of the channel to narrow the river's cross section and repairs were made on the north jetty. These measures have lessened entrance shoaling.

The authorized channel at the entrance is 26 feet deep and 400 feet wide. The river channel, 22 feet deep and 200 feet wide, extends from the entrance to Reedsport at RM 11+40. A turning basin at Reedsport is 22 feet deep, 600 feet wide, and 1,000 feet long. Two adjacent, but unconnected, boat basins ("Salmon Harbor") are located at Winchester Bay near RM 1.5. Access channels to those boat basins are 16 feet deep and 100 feet wide.

In the channel to the east basin, the southernmost 950 feet is maintained at 12 feet deep and 75 feet wide. That boat basin includes a 1-foot deep, 17-foot wide, 300-foot long turning basin. A turning basin in the west boat basin is also 16 feet deep.

Another side channel, in the vicinity of RM 8.0, provides access to Gardiner. The Gardiner channel is 22 feet deep and 200 feet wide. A turning basin at Gardiner is authorized to 22 feet deep, 500 feet wide, and 800 feet long, but is not currently maintained to those dimensions.

A project modification provides for a channel 12 feet deep and 100 feet wide in the Scholfield River starting at RM 10.8 and running for two miles to a point 0.5 miles below the first railroad bridge. This channel is classified as an inactive project.

A related project is authorized in Smith River. This project provides for a channel 6 feet deep and 100 feet wide from the mouth of Smith River to the mouth of North Fork, then 4 feet deep and 75 feet wide to Sulphur Springs Landing, with a passing place near the mouth of North Fork. This project was last dredged in 1973. There is currently no need to dredge. If dredging becomes required, new disposal sites will need to be identified and a new public notice will be issued.

Maintenance: Umpqua Entrance

To reduce maintenance, the entrance channel was realigned in 1982 to take advantage of the deep water off the south jetty. Shoals continue

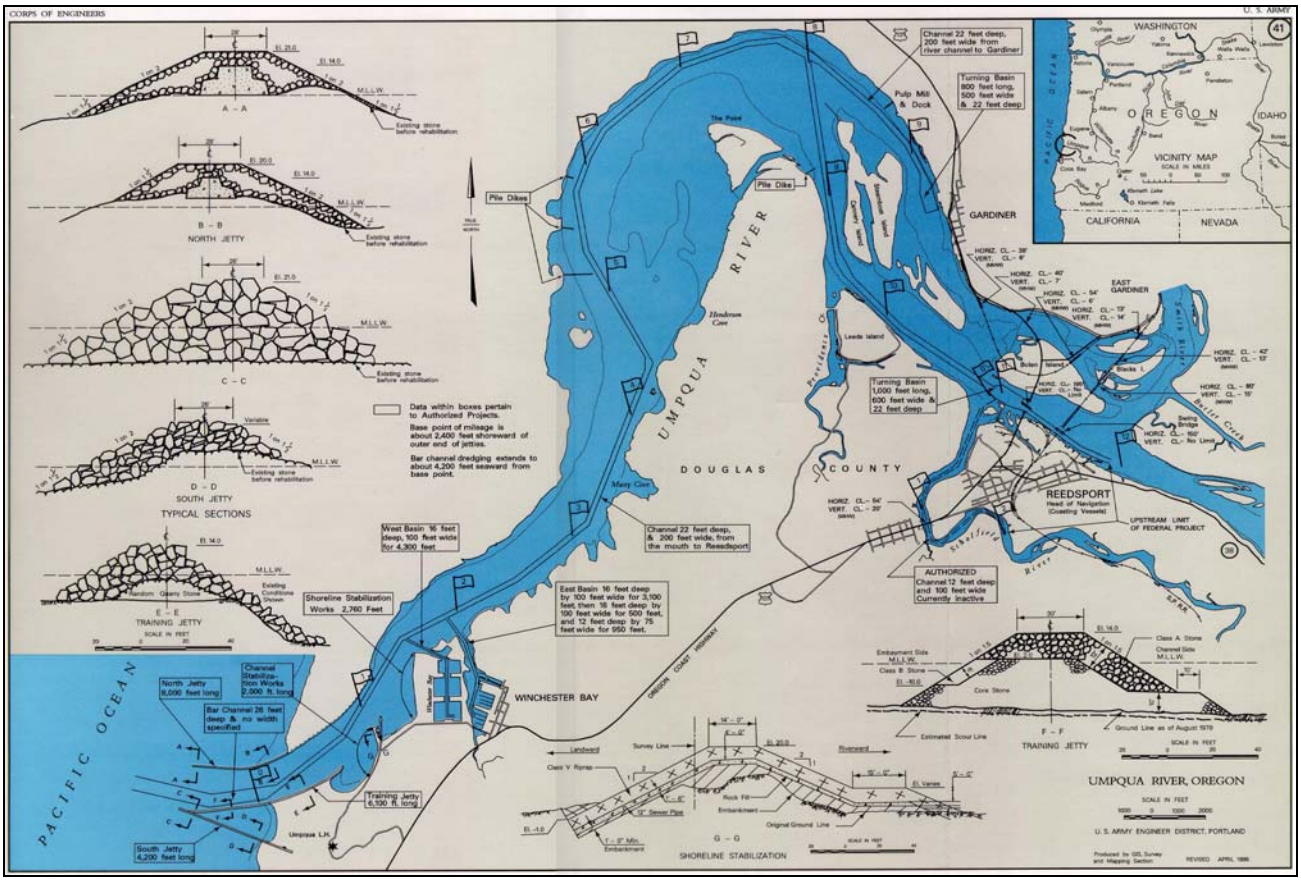

Figure 1: Umpqua River Vicinity Map

to build across the channel during late winter, spring, and summer offshore from the jetties in the vicinity of RM -1.2. The channel realignment has reduced the extent of the problem.

Hopper dredges operate between May and September to maintain the Umpqua entrance: adverse sea conditions prevent dredging at other times of the year. Dredging to 28 to 30 feet maintains project depth between dredging operations.

Maintenance: Umpqua River

A small hopper dredge works the Umpqua River inside shoals. Dredging occurs after September 15, to the extent practicable, to reduce the environmental impact within the estuary. Dredging in the bay before September 15 will be allowed as foul weather back-up (i.e., if it is unsafe to cross the bar) or if critical shoals develop.

Hopper dredge, clamshell dredge, or channel flushing can maintain the entrance channels at Winchester Bay. The Portland District used the channel flusher SANDWICK in both the east and the west channels during FY 1990 and will use it as necessary in future. The SANDWICK is, however, only used on an outgoing tide, so that the suspended sediments are swept downstream and into the ocean. Sediment removed by clamshell or hopper dredges is generally placed at the in-water site on the north side of the channel at RM 0.8.

Sediment

The sediment at the entrance of the Umpqua River is sand, with an average in-place density of 2,000 grams/liter. Sediment in the Umpqua River itself is also generally sand, with an average in-place density of 1,600 to 1,900 grams/Liter. Some silt is found in the Salmon Harbor area, and in the upper reaches of the channel.

In 1986, the hopper dredge YAQUINA found pockets of a black "emulsified" sediment in Gardiner channel. Dredging was suspended. Sediment samples were collected at that time and no oil or other contaminants were detected. Sediments in Gardiner channel were tested again in 1989 and found acceptable for unconfined in-water disposal. Maintenance of the channel by hopper dredge was resumed in 1990.

Sediment Evaluation

1979 July, Winchester Bay sediments were evaluated for open water disposal.

1980 October, Sediment samples from the main channel of the federal navigation channel were collected by the Portland District as part of a coastal evaluation of authorized coastal projects. The evaluation included bulk and elutriate chemical analyses as well as physical analysis.

In 1986, the hopper dredge YAQUINA found pockets of a black "emulsified" sediment in Gardiner Channel. Dredging was suspended. Sediment samples were collected at that time and no oil or other contaminants were detected. Sediments in Gardiner Channel were tested again in 1989 and found acceptable for unconfined in-water disposal. Maintenance of the channel by hopper dredge was resumed in 1990. In October 1991 the dredge YAQUINA again encountered oil in the vicinity of the fueling dock while dredging Gardiner Channel. Dredging was discontinued and water/oil samples collected for analysis. Analyses conducted by the NPD Materials Laboratory showed the material to be weathered Bunker Oil C (Diesel Fuel 6). The Gardiner Channel is currently being maintained to a depth of -18 feet MLLW (project depth is -22 feet MLLW) to avoid and remaining contaminated sediment.

1989 February, Sediment samples were collected from Gardiner Channel and analyzed chemically and physically.

1991 September, Samples were collected from shoals in the main channel and from the turning basins in Gardiner Channel and near Reedsport Docks. Physical and chemical (one sample) analyses were conducted. All material was determined to be suitable for in-water disposal. Sediment samples were also collected for various locations from the Winchester Bay access channel to evaluate the suitability of the bay sediment for the development of wetland habitat on the North Spit.

1992 April, Additional evaluations of the suitability of the Winchester Bay sediments for the development of wetland were conducted by Portland District.

1996 July, Nine samples were collected using box corer sampling gear on July 30, 1996. All samples were subjected to physical tests. Sample UQR-BC-3, from the Reedsport turning basin, and samples UQR-BC -4, -7, and -8, taken from the Gardiner channel and turning basin, and UQR-BC-9 sampled from immediately downstream of the confluence of the Gardiner and main channels were silty and were therefore also subjected to chemical analysis. The volatile solids content in the Gardiner channel sediment was the highest of all samples analyzed, ranging from 4.8 to 5.9 percent; the remaining samples had a volatile solids content ranging from 0.7 to 2.8 percent. Concentrations of all metal in the samples tested were below screening levels. Four of the five samples analyzed yielded low levels of 4,4'DDE, however, the values are estimated since each analyte was below the laboratory reporting limits of 10 ppb but above the method detection level of 0.3 ppb. There were no PCB's found in any of the samples tested. All sediment samples analyzed contained PAH's however, total PAH in all samples were far below established concern levels.

Organotins were detected in all samples in or near the Gardiner turning basin. However, each analyte is below the laboratory reporting limits of 3 ppb for the compound, but above the method detection limit of 0.3 ppb. All material from the Federal project was determined to be suitable of unconfined in-water disposal without further evaluations.

2001 February, Eight (8) surface grab sediment samples were collected from the Umpqua River and six (6) samples from Winchester Bay. All samples were submitted for physical analyses (mean 0.18 mm, with 77.59% sand and 22.28% fines), with 6 samples analyzed for metals, total organic carbon (TOC), pesticides/polychlorinated biphenyls (PCBs), phenols, phthalates, miscellaneous extractables, polynuclear aromatic hydrocarbons (PAHs) and organotin (TBT) pore water analysis.

Sediment represented by samples collected during this sampling event exceeded the Tier II guidelines screening level (SL) in one sample (WB-BC-03) for benzoic acid (1.2 times the DMEF screening level). Because benzoic acid is found in many natural forms and because neither Winchester Bay nor the sample in question have any known source of benzoic acid in the vicinity, the benzoic acid detected is thought to be an isolated, most likely a natural source, of benzoic acid. In light of this determination all sediment represented by this sampling event is considered to be suitable for unconfined, in-water placement without further characterization.

2006 August, On August 29-30, 2006 a total of eighteen (18) samples were collected from the Umpqua River Main Channel, Winchester Bay and Gardiner Channel. All eighteen (18) samples were submitted for physical analyses including total volatile solids. Seven (7) of the eighteen (18) samples were, also, analyzed for metals (9 inorganic), total organic carbon, pesticides and polychlorinated biphenyls, phenols, phthalates, miscellaneous extractables, polynuclear aromatic hydrocarbon, with six (6) samples selected for both total sediment (bulk) and pore-water organotin, although only bulk analyses were conducted due to lack of pore-water volume.

The physical analyses resulted in mean values of 0.37% gravel (shell hash - 0.0%-1.2%range), 76.0% sand (15.0%-98.4% range), and 23.7% silt/clay (1.3%-84.9% range), with 6.82% volatile solids (1.67%-13.2% range only measured on ten (10) of the eighteen (18) samples.

The chemical analyses indicated only very low levels of contamination in any of the samples, with all levels below their respective DMEF and SEF screening levels (SLs). No PCBs or chlorinated hydrocarbons were found at the MDL in any of the samples. Several metals, organotins, pesticides, phthalates, miscellaneous extractables, phenols and low and high molecular weight PAHs were detected but at low levels. Detection levels were sufficient to evaluate material proposed for dredging. The analytical results of this characterization are consistent with historical data. Material represented by all samples in this sampling event is determined to be suitable for unconfined, in-water placement without further characterization.

1984-1985 ODMDS Sampling

Samples located in the Umpqua River Zone of Siting Feasibility (ZSF) were collected in September 1984 and January 1985. Sampling stations were located on the 60-, 70-, 80-, 90-, 100- and 110-foot depth contours as part of the baseline survey (see figure). Two reference transects were also sampled north and south of the Umpqua Zone of Siting Feasibility ZSF. The reference transects were located far enough north and south to be out of the influence of past disposal offshore at Umpqua River, and are labeled UR-3 and 4. Six replicate bottom samples were taken from each of the 24 stations using a modified Gray-O'Hara box corer that sampled a 0.096-square meter area of the bottom. Samples were sent to the Corps' Materials Testing Laboratory for determination of sediment grain size and organic content. No chemical analyses were conducted.

Sediments from all stations sampled in the ZSF consisted of medium- to fine-grained sand inside the Interim (1977) ODMDS (median 0.3 mm), and fine-grained sand outside of the Interim ODMDS (median 0.16 mm). The Section 103 ODMDS contained fine-grained sand (median 0.17 mm). Change in the grain size between the two surveys was not consistent within the ZSF. Thirteen of the 18 stations outside of the Interim ODMDS showed a decrease in grain size, while 4 of the 6 Interim ODMDS stations increased in grain size. For the most part the change in grain size was inconsequential, with 11 of the external stations showing a change less than or equal to 0.1 phi. Only two changed more than 0.3 phi. Within the disposal site the change was usually greater. Two stations increased by more that 0.35 phi. Increased grain size outside the disposal site was located in the deeper half of the ZSF adjacent to the site. In no case did a change in grain size bring the sediment outside the disposal site as close as 0.6 phi to the dredge material. It was not possible to infer movement of dredge material from the disposal site. Conversely, blanketing of the disposal site by native sediments did not seem to have occurred. The material placed at the Interim ODMDS was dredged from the outer channel bar and the Umpqua River entrance. Samples taken from these areas in January 1979 had median grain sizes of 0.30 mm and 0.225 mm. This was coarser than the native offshore sediment, a difference that was also seen in the Interim ODMDS.

2007 ODMDS Sampling

At the Section 103 and proposed North and South ODMDSs, a Gray-O'Hara modified 0.96-m^2 box core was used by the Corps to collect benthic infauna and sediment samples at 16 stations in June 2007 (see figure). No sediment samples were collected at the historic Interim (1977) ODMDS. Two samples (#8 and #9) were collected along the centerline of the Section 103 ODMDS at depths of 90 and 110 feet. Five samples were collected from each of the proposed ODMDSs at depths of 40, 60, 80, 100, and 120 feet. Two sites located north and south of the proposed ODMDSs were selected as reference stations. Two grab samples were collected from each reference station at a depth from 60 to 120 feet. All samples were subjected to physical and chemical analysis.

The 2007 sediment samples show the offshore area in the vicinity of the Section 103 ODMDS, the proposed North and South ODMDSs, and reference areas to be uniform in

texture and characteristics. The percent sand size and greater, including gravel, had a narrow range from 95% to 98%. Percent fines (percent passing a 230 sieve, silt and clay) ranged from 1.98% to 4.97% with a mean of 3.18%. Organic content measured as percent total volatile solids (TVS) ranged from 1.0% to 1.88% with a mean of 1.33%. There was no discernable difference in stations located in the actively used Section 103 ODMDS and those areas which have not received dredged material from the Umpqua River navigation project.

Bulk chemical analyses were conducted on sediments from the 16 offshore locations. Analyses were conducted in accordance with the 2006 SEF similar to the analyses conducted for the Umpqua River navigation project. This included analyses for metals (10 inorganic), TOC, pesticides, PCBs, phenols, phthalates, miscellaneous extractables, and PAHs.

Metals (EPA method 6010/7471), Total Organic Carbon (EPA method 9060). All 16 samples were submitted for metals testing. All sixteen samples were analyzed for TOC which ranged from 0.06% to 0.59% with an average of 0.15%. Low levels of metals were detected in all sampling areas. No sample had detectable silver (Ag) or mercury (Hg) above their respective MDL of 0.02 ppm or 0.005 ppm. Minimum, maximum, and average metal concentrations are shown in Table C-13. Maximum metal concentrations are Antimony (Sb) 0.05 ppm at UMPO070-BC-14, arsenic (As) 3.73 ppm at UMPO070-BC-08, cadmium (Cd) 0.07 ppm at UMPO070-BC-11, and UMPO070-BC-13, chromium (Cr) 23.3 ppm at UMPO070-BC-15, copper (Cu) 5.9 ppm at UMPO070-BC-11, lead (Pb) 2.35 ppm at UMPO070-BC-13, nickel (Ni) 17.9 ppm at UMPO070-BC-11 and zinc (Zn) 22.0 ppm at UMPO070-BC-15. All metal concentrations were well below their respective SEF 2006 screening criteria and are considered typical background levels.

Pesticides/PCBs (EPA method 8080). All 16 samples were submitted for pesticide and PCB analysis. Three sediment samples had detectable levels below method reporting limits (MRLs) but above MDLs. Sample UMPO0700-BC-11 had detectable levels of aldrin (0.30 ppb) and gamma-chlordane (0.39 ppb). Samples UMPO0700-BC-02 and UMPO0700-BC-03 had detectable levels below MRLs but above MDLs of 4,4'-DDT and 0.22 ppb and 0.15 ppb, respectively. No PCBs were found at the MDL in any of the samples.

Phenols, Phthalates, Miscellaneous Extractables, and Chlorinated Hydrocarbons (EPA method 8270). Phenol was detected above laboratory reporting limits in all 16 samples. Phenol was detected at estimated levels (JT) in all samples except UMPO0707-BC-11 which had a level of 43 ppb. All concentrations of phenol detected were below DMEF and SEF screening levels. The chemical 4-methylphenol was detected in five samples. Three samples were low estimated values but two, UMPO0707-BC-03 and UMPO0707-BC-11, had values of 190 ppb and 1,000 ppb, respectively. Sample UMPO0707-BC-11 exceeds the SEF screening level for 4-methylphenol (670 ppb). Stations UMPO0707-BC-03 and UMPO0707-BC-11 are located in areas not affected by past dredged material disposal.

Di-n-butyl phthalate was detected in all sixteen samples at estimated levels below laboratory reporting limits. Concentrations ranged from 16JT to 37 ppb. Note that Di-n-butyl phthalate is a common laboratory contaminate and was detected at 19 ppb in the method blank. All phthalate concentrations were orders of magnitude below the SEF 2006 screening levels. No miscellaneous extractable compounds except for low levels of benzyl alcohol (ranging from 2.7 to 6.9 ppb) were detected. No chlorinated hydrocarbons were found at the MDL in any samples.

Polynuclear Aromatic Hydrocarbons (EPA method 8270C). All 16 samples were submitted for testing. No PAHs were detected above the MDL in any sample.